AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations of the du Pont Company and its subsidiary companies. It also contains published reports and direct contributions of investigators of agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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THE WAR AND AGRICULTURAL RESEARCH

EDITOR'S NOTE: One of the important by-products of the war is the change in emphasis and direction of agricultural research. It is true, as stated by Prof. Lewis W. Taylor, Division of Poultry Husbandry, University of California, that "war will not change the fact that intelligent research is the best antidote for a lack of knowledge." In wartime, adjustments must be made quickly. Research, while continuing to remember that fundamentals remain unchanged, must be re-directed and speeded up to help make the essential adjustments as simple and practical as possible. In England the demands for increased production of certain foods have caused a revolutionary change in that country's agriculture. Francis Flood of "The Ohio Farmer", touring war-torn England, reports that before the war, in 1939, Kent County had 166,000 acres under the plow and 430,000 in pasture. In 1941, Kent had 266,000 under the plow and 336,000 in pasture. Then, too, such wartime innovations as blackouts and bombings created new problems in England and Hawaii. What effect does the war have on poultry and other rations? What effect does a bomb explosion have on egg production? Does the blackout create any special problems for the dairyman or the poultryman? That research and other agricultural workers in this country are aware of these questions is evinced by such discussions as that on "Blackouts in the Poultry House" by Roy E. Jones, Extension poultryman, Conn. Agr. College, Storrs, in "New England Homestead", who says questions have been coming in regarding the poultrymen's procedure in case of a blackout. Observations from England and Hawaii, such as those below, indicate some of the emergency questions our research workers may soon be called on to solve here in the United States.

The War Changes Poultry Rations in England

In the two years since the war began, English poultrymen have had to learn poultry keeping all over again, for nearly every phase of management has been changed by war conditions, says Paul F. Worcester in the "National Poultry Digest" of August 15, 1941.

There's the matter of poultry feed -- rations, they are sometimes called. Steaming, pressure-cooking, and boiling of housescraps is the order of the day for English poultrymen. A few large cities have instituted municipal collection systems, and are processing the waste into "pudding" or meal. Waste from London households is gathered, cooked, and sold as "Tottenham pudding" in hundred-pound molds. Although it is roughly sorted, it contains occasional bones, cabbage stalks, and even knives and forks. However, the authorities, following

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considerable research, are putting on the market an improved product consisting of cooked housescraps dried off with sawdust, and sifted to remove any small indigestible material.

One poultryman feeds a mixed ration of 72% "Tottenham pudding", 20% layer's mash (rationed on the basis of the number of birds owned), 7% pine sawdust, and 1 quart of cod liver oil per 100 pounds of mixture. More than 2,000 caged layers are being fed this mash, 5 ounces daily per bird, and the owner claims production is better than before the war.

Waste collected at Aberdeen is processed by a milling firm into a meal. An approximate analysis of the product is: oil or fat 8%, protein 17%, fibre 8%, moisture 10%, ash 12%; soluble carbohydrates 45%.

Some poultrymen have established routes, and gather waste on regular days from householders, hospitals, army camps and municipal kitchens. All feeders must boil kitchen waste at least an hour to prevent spread of disease. After the cooking, comes pelleting and drying by sun or artificial means, or immediate feeding as wet mash.

So-called Chiscuits, prepared for chicks by mixing fish or meat offal, mashed potatoes, maize meal, bran and wheatings, cod liver oil, mineral mixture, and charcoal, give good results and are eagerly devoured by young chicks. The mixture is rolled out to 3/8-inch thickness and is cut into squares to fit a baking tin, and dried in a moderate oven. The cooked biscuit is put through a food chopper and fed in small granules.

There are numerous other systems, but in all of them food economy is foremost. More frequent feeding, less feed in the hoppers, various types of "no-waste" feeders, and reclaiming of spilled feed are emphasized.

British Hens Sometimes Lay Soft-Shell Eggs After Bombings

Regulations require blackout screens on all windows. At least one English poultryman was fined two pounds for having unshielded light in a hen house (the British call it a "cabin"). Surprisingly, exploding bombs do not seem seriously to affect production. Softshell eggs may be laid for a day or two and, in some instances, a premature molt may follow a bombing. One newspaper correspondent reported that a bomb blew a dozen hens out of a hen house, and next day their combs had turned pale with shock. A couple of days later, however, they laid six eggs, and have contined a high rate of production ever since.

The poultry housing problem is not as acute as might be expected for "blitzed wood" from bomb damaged buildings is readily available.

Sale of eggs is carefully controlled. Eggs sold for hatching purposes must be stamped with an "H", and can be sold at advanced prices.

Mrs. Winston Churchill was told that the principal item on a luncheon served to her and 150 homeless persons was "bombed chicken". Birds killed in air raids had been donated by farmers.

Blackout Creates Problems for Hawaiian Dairy Farmers

Dairymen in Hawaii are required to blackout their dairy barns as well as their homes. Dairymen did not have to be told that any interruption of regular twice-a-day milking spaced at 12-hour intervals would have a serious effect on normal milk production and the cow's health and condition, says Frank G. Sutherland, assistant animal husbandman, University of Hawaii Agricultural Extension Service. He reports:

"When war broke out on December 7, several of the dairymen located in and near Honolulu realized the importance of doing something immediately about blacking out their milk barns.

"There were a great many problems confronting them. Cows had to be driven into the barns and locked up in their individual stanchions, washed, fed and milked. The milk had to be poured into coolers, the cows unlocked from their stanchions and gotten out of the barn.

"All this without any light shining out into the night!

"By midnight, Sunday, December 7, many milk barns had been at least partially blacked out. Bright glaring light bulbs had to be replaced by smaller wattage ones, and had to be lowered down from ceiling by extension cords and hung on the walls behind the cows near the floor. Burlap bags were draped around the light bulbs; some were painted, where paint happened to be available. Tin cans of many sizes and shapes were hastily used as reflectors by cutting holes in the bottom and were attached to light sockets simply by screwing the bulbs through the hole made in the can.

"There was practically no moonlight at all for a period of at least 10 days after the war started.

"Open side walls and ends of milk barns were hastily boarded up or feed bags were opened up and hung from the eaves to prevent some of the light coming from the few bulbs being used in the milk barns from shining out across the country side or city area during the blackness of the night. Blue cloth or paper was wrapped around light bulbs or flashlights.

"At a few dairies, no attempt was made during the first or second night to get the cows into the barn and carry on any normal night work.

"However, by the third or fourth night many of the dairymen had made some kind of darkened light arrangements to resume night milking.

"By Saturday night, January 13, it was found that a large majority of the dairies throughout the island of Oahu were milking at night. As a result, milk production increased somewhat over what it had been during the first week after the blackout went into effect. Fewer udders were spoiled, cows were becoming better adjusted to the inconveniences being forced upon them and were more inclined to do their part in converting what feed was available to them into all the milk possible, other things being equal.

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"As dairymen were able to get their barns blacked out and milking done at regular 12-hour intervals, they reported more favorably on milk production."

Soil Conservation Work Helps Prevent Landing of Planes in Hawaii

Laying out of pineapple fields in accordance with soil conservation methods has been found to have an unexpected advantage, says the "Hawaii Farm and Home." Old type fields offer possible landing fields for hostile planes, and have been lined with either pineapple boxes or tall embedded poles. Terraced fields, however, require no precautions for the terraces are enough obstacle for planes.

Victory Gardens in Hawaii Too

Hundreds of Victory Gardens have been planted throughout Hawaii, and agricultural workers and others are cooperating in every way to bring the results of research with vegetables to those who are participating. A trained garden teacher has been assigned to nearly every city school to devote part time to the garden work of the community. The committee has distributed seedlings and other planting materials, has published leaflets giving advice on home gardening, has arranged for experts to visit gardeners having difficulties, and has organized "flying squadrons" of sprayers to combat insect pests and diseases. Even the military police at Schofield Barracks have a garden to grow green onions, lettuce, Chinese cabbage, carrots, beets and radishes.

Mayor Lester Petrie of Honolulu has urged Honolulans not to let the dirt over bomb shelters remain just an ugly, bare pile. He recommends planting flowers or, better still, vegetables. Ashley C. Browne of the University of Hawaii Agricultural Extension Service suggests sweet potatoes as an ideal bomb shelter plant because they will cover the mound with a mass of greenery. He says the dirt over sandbags and other materials must be fairly deep, otherwise, "when you dig the potatoes, you'll dig into the bags." He recommends avoiding vegetables with too deep roots, as well as vegetables which grow too tall, especially if the shelter is high and in a windy location.

Use of Coconuts in Hawaii

Research workers in Hawaii are turning their attention to making more use of coconuts, a local product. They report that two by-products of coconuts are oil and coconut syrup. The oil can be used for cooking. Alice P. Trimble, assistant in home economics of the University of Hawaii Agricultural Extension Service, has issued considerable information to the rural people of the territory on how to extract the oil and how to make the syrup. In pointing out the importance of avoiding waste, she says that while the coconut meat left after extracting the oil has little food value, it can be fed to chickens.

Effect of War on Shipment of Canned Pineapple from Hawaii

Shipments of canned pineapple and juice to the mainland from Hawaii during January totaled about 2,000,000 cases, slightly more than in January a year ago. In December only about 600,000 cases were shipped.

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TETRAMETHYL THIURAMDISULFIDE*, A NEW TURF FUNGICIDE

EDITOR'S NOTE: Farmers and gardeners are large consumers of metals and chemicals in the form of machinery, fertilizers, insecticides, fungicides, and other materials essential to efficient plant growth. Our war program also requires enormous quantities of some of these same metals and chemicals. This has naturally stimulated the search for more efficient products and substitutes suitable for use on the farm, the garden, and the golf course. For example, many fungicides depend for their efficacy on the toxicity of such metallic compounds as those of copper, zinc, and mercury. These metals are also essential to the conduct of war, and hence the demand for substitutes or for more efficient compounds of them for use as fungicides becomes of increasing importance. The following is an example of what can be and is being done in this field of chemical and agricultural research. Reports in subsequent issues of the "Agricultural News Letter" will discuss the use of a similar compound as a seed treatment for a variety of farm crops, including vegetables, peanuts, and field-crop legumes, on which experimental work is now underway.

By G. F. Miles, Director Research Dept.
Bayer-Semesan Company
Du Pont Building, Wilmington, Delaware.

Control of Brown Patch and Dollar Spot Diseases of Bent Grass Turf

Control of the brown patch and dollar spot diseases of bent grass turfs has long been a fertile source of discussion at gatherings of greenskeepers. Because mercury has for many years been the first line of defense against these invaders, the discussions have naturally included the comparative merits of the various organic and inorganic mercurials used for that purpose.

As the supplies of mercury available for civilian use dwindle, however, the question is no longer, "Which mercurial?" but, "What can we use in place of mercury?" This question, new perhaps to most of those engaged in controlling brown patch and dollar spot, is an old one to the plant pathologists and chemists of the Bayer-Semesan Company and its affiliates.

The search for effective non-mercurial fungicides is a long story. Surely among the hundreds of thousands of compounds, organic and inorganic, there must be some, one at least, that possesses the high order of fungicidal efficiency for which the mercurials are known. As compound after compound emerges from the chemist's laboratory and comes under the critical eye of the plant pathologist, however, the wonder grows that Nature has apparently bestowed her prizes for highest fungicidal efficiency on so many mercurials and on so few non-mercurials.

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But out of all this sifting and painstaking examination of these thousands of chemical compounds comes an occasional pat on the back to the searchers. Now and then a rough diamond is found which gives promise that it can be adapted to our needs and added to man's meager supply of weapons for use in combating destructive fungous diseases.

One of the most promising of these non-mercurial fungicides is an organic compound of sulfur, tetramethyl thiuramdisulfide*, soon to be marketed under the trade-mark of "Thiosan", as a new turf fungicide. Containing neither mercury nor any other metallic element, it is relatively non-poisonous to warm-blooded animals but toxic to fish. The formula for use on turf will provide a finely-divided powder with only a slight odor, which is not disagreeable. Although water insoluble, it disperses readily in water with a little agitation.

Although not in the same fungicidal class with the highly active ethyl mercurial compounds used in seed treatments for grain and cotton, the new product does compare favorably with hydroxymercurichlorophenol and hydroxymercuricresol as represented by products sold under the trade-mark "Semesan" and Special "Semesan", which are now widely used as turf fungicides. The effectiveness of this newcomer to the list of available fungicides has been demonstrated by tests on turf nurseries and on eighteen playing greens in Delaware and New Jersey. Comparative tests carried out by spraying half of each green with 1 pound of Special "Semesan" to 6000 square feet of turf and the other half with the same amount of "Thiosan" have shown the new product to have approximately the same fungicidal value as the mercurial.

Confirmation of the merits of tetramethyl thiuramdisulfide as a turf fungicide has come from the U. S. Golf Association Green Section in a report by Harrington. (Science, Vol. 93, No. 2413, p. 311.) In discussing experimental results for 1940, he states that of the more than 100 chemicals tested, tetramethyl thiuramdisulfideis one of the most promising.

One of the outstanding and very desirable advantages of the new fungicide is the high degree to which it is tolerated by bent grass and most other foliages. The plant pathologist says it has a wide margin of safety, meaning that many times the effective dosage may be applied without injury. On Washington, Metropolitan, Colonial, and Velvet bent turfs, for example, applications of 4 pounds to 6,000 square feet at weekly intervals for 6 weeks did not produce any indications of yellowing or retarded growth. In these times when greenskeepers may need to depend on inexperienced workmen, this wide margin of safety may be particularly advantageous.

Lest some read too much between the lines, it should be said that "Thiosan" is not fool proof; it does not take the place of the greenskeeper's skill, watchfulness, and judgment. Grass grows rapidly, and sometimes the brown patch and dollar spot fungi grow even more rapidly. No matter, therefore, how effective the fungicide used, it, like others, will fail dismally unless the greenskeeper watches weather conditions closely, and uses all his powers of observation, skill, and experience in applying suitable dosages at the right time.

Translated into terms of greenskeeping practice, this means that the dosage and intervals between applications will not be the same for all conditions. While

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applications of 1 pound to 6,000 square feet at intervals of 7 to 10 days seem to be optimum under ordinary conditions when a preventive program of disease control is followed, it may be necessary to double the dosage when conditions unusually favorable to infection occur or are anticipated.

To summarize, it is believed that "Thiosan", the new turf fungicide, containing tetramethyl thiuramdisulfide, will fill the gap left by the scarcity of mercury, and that it will accomplish its task of disease control without injury to the grass.

*-The use of this product in the field of turf fungicides is covered by the U. S. Patent No. 1,972,961.

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SUGGESTED REDUCTIONS IN ROTENONE CONTENT OF INSECTICIDE DUST MIXTURES APPLIED TO VEGETABLES

EDITOR'S NOTE: A number of important ingredients in insecticides, many of which were formerly imported from areas now at war or severely affected by the war, have become relatively scarce. One of these -- rotenone -- can be used in somewhat smaller quantities in insecticides normally applied to control certain insects which attack vegetables. The following present and revised recommendations, prepared by the U.S. Bureau of Entomology and Plant Quarantine as Circular E-560, dated February, 1942, deals with insecticides for cabbage caterpillar on cabbage, cauliflower, broccoli, kale, and collards; pea aphid and pea weevil; turnip aphid; and Mexican bean beetle.

In view of the probable shortage of rotenone which has been imposed by war conditions, with the consequent necessity of conserving available supplies of this material, it seems possible that, without a marked loss in effectiveness, slight reductions can be made in the rotenone content of insecticides recommended by this Bureau for use in the control of certain of the more important insects which attack vegetables. Such reductions, however, make it necessary that extreme care be taken to make certain that the rotenone content is not lower than that shown in the revised recommendations given below. These reductions also require that there be no decreases in the recommended dosages or rates of application per acre, that equipment be used that will ensure a thorough coverage of the treated plants, and that the insecticide applications be made at the proper time.

As a further measure in conserving the supplies of rotenone, emphasis is placed upon the desirability of using, whenever possible, and with the restrictions mentioned below, certain substitutes for insecticides containing rotenone.

Cabbage Caterpillar on Cabbage

Present recommendation: For mixed populations of cabbage caterpillars* attacking cabbage the present recommendations specify (1) the use of dust mixtures containing 1.0 percent of rotenone applied at the rate of 15 to 25 pounds per acre, depending upon the size of the plants, or (2) the use of pyrethrum dust mixtures containing approximately 0.3 percent of total pyrethrins, at the same rate as in (1).

Revised recommendation: (1) It is believed that reasonably satisfactory control of cabbage caterpillars on cabbage can be achieved by applying a dust mixture containing 0.75 percent of rotenone at the rate of application mentioned

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* Imported cabbage worm, cabbage looper, and diamondback moth.

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previously, with the provision that if one application is not effective a second application be given. (2) It is recommended that whenever possible pyrethrum dust mixtures containing 0.3 percent of total pyrethrins, or impregnated pyrethrum dusts containing 0.3 percent of total pyrethrins, be used instead of the dust mixtures or dusts containing rotenone.

Note: Dust mixtures or dusts containing the dilutions of rotenone or pyrethrum mentioned in this circular may be used for the purpose indicated at any time during the growth of the crop without incurring the harmful residue hazard.

Substitutes recommended: The following insecticides may be applied prior to the heading of the cabbage plants, although in general they are less effective in controlling cabbage caterpillars than dust mixtures containing the recommended dilutions of rotenone or pyrethrum.

(1) Paris green (1 pound) and hydrated lime (9 pounds)
(2) Cryolite (1 pound) and talc or clay (2 pounds)
(3) Calcium arsenate, undiluted

Caution: Paris green, cryolite, and calcium arsenate should not be used on any portion of the cabbage plant that is to be marketed. This means that cabbage intended for marketing as U. S. grade No. 1 (which allows four loose outer leaves) should not be poisoned with these materials after the heads begin to form. If the marketed product is to bear a greater number of loose outer leaves than those allowed in the above grade, these materials should not be used after the plants have been thinned or transplanted.

Cabbage Caterpillar on Cauliflower, Broccoli, Kale, and Collards

The derris or pyrethrum dust mixture recommended for the control of cabbage caterpillars on cabbage should also be used for the control of these caterpillars on cauliflower, broccoli, kale, collards, and similar crops. Special care should be taken to get a complete coverage of the affected parts of the plant with the insecticide.

It should be emphasized that arsenicals, cryolite, or other inorganic insecticides are not recommended for cabbage caterpillar control on these crops at any time after thinning or transplanting owing to the poisonous residues likely to remain on the edible portion.

Pea Aphid

Present recommendation: Specifies (1) the use of a dust mixture containing 1.0 percent of rotenone, applied at the rate of 35 to 40 pounds per acre, or (2) the use of a dust mixture containing 4 percent of nicotine, applied at the same rate per acre as in (1).

Revised recommendation: (1) As a revised recommendation it is suggested that during the emergency the rotenone content of the dust mixture be reduced to 0.75 percent, with the provision that the applications be made early in the stage of the pea aphid infestation and that the dust mixture be applied thoroughly to the

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plants at the same rate mentioned previously. In applying this dust mixture the boom on the duster should be enclosed completely, and a trailer 25 feet or more in length should be used. The insecticide is most effective when there is little or no wind movement. Fields receiving the reduced rotenone content dust mixture should be watched carefully and a second application made if such is found to be necessary in order to achieve control. (2) It is recommended that whenever possible a dust mixture containing 4 percent of nicotine be substituted for one containing rotenone for use against the pea aphid. The nicotine dust mixture may be made up according to the following formula:

Hydrated lime - - - - - - - - - - -	40 pounds
Monohydrated copper sulfate - - -	3 to 5 pounds
40% nicotine sulfate - - - - -	5 pounds (2 quarts)

It is emphasized that for satisfactory results against the pea aphid with the nicotine dust mixture it is necessary to use a trailer at least 40 feet in length and that this dust mixture should be applied when the air temperature is above 65° F. and when the vines are dry.

Mexican Bean Beetle

Present recommendation: Specified (1) the use of a dust mixture containing 0.5 percent of rotenone, applied at the rate of 20 to 25 pounds per acre per application against the Mexican bean beetle; or (2) the use of a dust mixture, applied at the same rate per acre as in (1), made up according to the following formula:

Cryolite - - - - - - - - - - - - - - -	60 pounds
Finely ground talc or sulfur - - -	40 pounds

Caution: To avoid the harmful residue hazard, cryolite should not be applied to beans intended for harvest as green or snap beans after the pods begin to form.

Revised recommendation: As a revised recommendation for the control of the Mexican bean beetle during the present emergency, it is suggested: (1) That no change be made in the present recommended dilution of the dust mixture containing rotenone but that as a means of conserving supplies of rotenone materials every effort be made to use efficient equipment for applying this dust mixture and that the recommended rate of application per acre be not exceeded. (2) That whenever possible the cryolite dust mixture be used as a substitute for the rotenone dust mixture, with the provision that this material be not used after the pods begin to form on beans intended for harvest as green or snap beans, in order to avoid the harmful residue hazard. It should be understood also that in some instances the cryolite dust mixture has not been so efficient as the rotenone dust mixture in killing the Mexican bean beetle.

Substitutes recommended: It is recommended for the duration of the present emergency that whenever possible dust mixtures containing approximately 0.5 percent of total pyrethrins, or impregnated pyrethrum dusts containing approximately 0.3 percent of total pyrethrins, be substituted for the dust mixtures containing rotenone or cryolite, against the Mexican bean beetle.

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Pea Weevil

Present recommendation: Specifies that a dust mixture containing not less than 0.75 percent of rotenone, applied at the rate of 20 to 25 pounds per acre, be used for the control of the pea weevil. Dust mixtures containing 1 percent of rotenone are also recommended. In applying this dust mixture the boom on the duster should be enclosed completely, and a trailer 25 feet or more in length should be used. Effective applications can not be made if the wind velocity exceeds 12 miles per hour.

Revised recommendation: As a revised recommendation for the control of the pea weevil during the present emergency it is suggested that dust mixtures containing 0.75 percent of rotenone be used for the control of the pea weevil at the same recommended rate and method of application as at present, with emphasis upon the same precautions as have been mentioned for the pea aphid.

Turnip Aphid

Present recommendation: Specifies the use of a dust mixture containing 1.0 percent of rotenone or a dust mixture containing 3 percent of nicotine.

Revised recommendation: (1) As a revised recommendation for the control of the turnip aphid during the present emergency it is suggested that the rotenone content of the rotenone dust mixture be reduced to 0.75 percent, with emphasis upon the same precautions as have been mentioned in the instance of the pea aphid, except that it is not essential to use a boom or trailer on the duster. (2) It is recommended that whenever possible a dust mixture containing 3 percent of nicotine be substituted for one containing rotenone. Such a nicotine dust mixture can be made up according to the following formula:

Hydrated lime - - - - - - - - - - - -	92½ pounds
40 percent nicotine sulfate - - - -	7½ pounds (3 quarts)

This dust mixture should be applied at the rate of 15 to 30 pounds per acre per application, depending on the size of the plants. It should not be applied when the temperature is below 65° F. or when the vines are wet.

Summary

The suggestions in the preceding discussion, insofar as rotenone compounds are concerned, may be summarized as follows: (1) That in the instances where a 1.0 percent rotenone dust mixture has been used against cabbage caterpillars, the pea aphid, and the turnip aphid a 0.75 percent rotenone dust mixture be substituted, provided that special emphasis be placed upon the thoroughness and timeliness of application of a dust mixture containing the recommended strength, with a dosage which does not exceed 30 pounds per acre. (2) That pyrethrum can be substituted for rotenone in the instance of cabbage caterpillars and the Mexican bean beetle. (3) That nicotine dust can be substituted in the instance of the pea aphid and the turnip aphid. (4) That the present recommendation for a dust mixture containing 0.5 percent of rotenone for the Mexican bean beetle should be continued.

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In addition it is recommended that for the control of flea beetles, striped cucumber beetles, lettuce and celery loopers, potato aphids, and asparagus beetles a dust mixture containing 0.75 percent of rotenone be substituted for the present practice of using a dust mixture containing 1.0 percent of rotenone.

The above recommendations are made with the full knowledge that the results of some experimental work indicate that strengths lower than 0.75 percent of rotenone can be used in some instances, but, considering the limited evidence available, and that the chances of failure to control the insect are increased with the lower strength dust and the minor saving involved, the recommendation of a dust of lower strength is not warranted for general purposes.

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PHENOTHIAZINE PROTECTS CHICKENS FROM LICE IN TEXAS TEST

EDITOR'S NOTE: The "Agricultural News Letter" has from time to time carried brief summaries of new information on phenothiazine as a worm treatment for sheep, goats, horses, mules, and swine. Phenothiazine has also been used with success to control cecal worms in poultry, as discussed briefly in the following article. In addition, phenothiazine was used to provide protection from lice in an experiment conducted with chickens by Henry E. Parish of the United States Department of Agriculture. The results of his findings are given below.

Chickens infested with four species of lice, dusted with phenothiazine in an experiment in Texas, were not only freed of these pests within 48 hours, but remained free from heavy reinfestation for 21 days, although they were allowed to mingle freely with heavily infested birds.

This experiment was conducted by Henry E. Parish of the U.S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, working in cooperation with the Division of Insects Attacking Animals and Man at Menard, Texas. It was made to determine the effect of phenothiazine on certain species of lice that infest chickens, as follows:

Head louse -- Lipeurus heterographus (Nitzsch)
Body louse -- Eomenacanthus stramineus (Nitzsch)
Shaft louse -- Menopon gallinae (L)
Fluff louse -- Gonicocotes hologaster (Nitzsch)

A rather heavily infested rooster was dusted with the chemical. Two days later he had no living lice.

Additional tests were conducted with four bantam hens that had very heavy infestations of body lice and light infestations of fluff lice. Nits were numerous on the head and large clusters were present in the region of the vent. The hens were dusted with phenothiazine. Two days later two untreated bantam hens and two untreated roosters, all heavily infested with lice, were placed in the pen with the treated fowls. Seven days after treatment, no living lice were found on the treated fowls, while the untreated ones were still heavily infested. Three weeks later, only four body lice were found on the treated hens, while the infestation on the untreated ones remained heavy.

Mr. Parish concludes that "results of these tests indicated that phenothiazine may provide extended protection to chickens from lice, since the treated hens had ample opportunity to become reinfested from the untreated roosters as well as the hens."

White chickens were temporarily discolored by the use of the phenothiazine.

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Since they suffered no ill effects, this discoloration might be considered of advantage in determining which chickens had been treated.

Excellent Medicine for Control of Cecal Worms in Chickens

Five per cent concentration of phenothiazine mixed into a commercial laying mash and fed to ten laying hens had no apparent ill effect on the birds in this Texas experiment.

This corroborates the findings of Dr. Ernest C. McCulloch, Division of Veterinary Science, State College of Washington, as to the safety of phenothiazine to chickens. As a matter of fact, phenothiazine has been found to be an excellent medicine for control of cecal worms in chickens. Dr. McCulloch and Lyle G. Nicholson report that until phenothiazine was successfully used, no anthelmintic had previously been reported that would safely and effectively remove the cecal worm Heterakis gallinae from poultry. They state that phenothiazine has an efficiency of between 95 to 100 per cent in removing cecal worms from poultry. The suggested dosage for poultry is between 0.05 and 0.5 grams. However, very large doses up to 500 times the therapeutic dose produced no harmful effect. Neither the therapeutic dosage nor the massive dosage had any effect on the flavor of the meat and the therapeutic dosage had no appreciable effect on egg production.

Note: A fuller review of the work of McCulloch and Nicholson will appear in the next issue of the "Agricultural News Letter".

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Agricultural News Letter (Du Pont)
Vol. 10, No.2 Mar.-Apr. 1942

TEN YEARS OF RESEARCH CONTRIBUTES "DELSTEROL" "D"-ACTIVATED ANIMAL STEROL

EDITOR'S NOTE: Listeners who tuned in on the Du Pont "Cavalcade of America" program March 9 heard the announcer tell of the U.S. Department of Agriculture's challenge to the American hen to produce 48 billion eggs this year -- 12 billion more than last year. The announcer told an interesting story of how, after 10 years of research, Du Pont chemists were able to announce the discovery of "D"-Activated Animal Sterol, trade-marked "Delsterol", which will have an important part in this program of increased egg production. He said scientists knew 20 years ago that chicks depended on vitamin D for sound bone development and normal growth and that laying hens needed vitamin D to produce satisfactory egg yields as well as eggs of desirable hatching qualities. The question was, where would enough vitamin D be found for all the baby chicks and laying hens -- 750 million in the U.S. today. The story of the long search for vitamin D sources which resulted in the discovery of "Delsterol" is told below. In addition, this discussion stresses the important fact that the poultry industry is now for the first time provided with a sure, controlled source of a vital feed ingredient independent of imported raw materials, now impossible or extremely difficult to obtain.

One of the most significant things about the recent discovery of a new source of vitamin D for poultry feeds is the fact that its production depends entirely on chemically regulated processes. Thus, the poultry industry is provided for the first time with a sure, controlled source of a vital feed ingredient independent of imported raw materials.

In fact, it is almost impossible to discuss this discovery and the production of "Delsterol" "D"-Activated Animal Sterol, without recognizing the importance of the word "control." Ever since the early 1920's, when vitamin D was first considered as contributing to sound chick growth, egg production, and hatchability, it has been realized that controlled sources of vitamin D are essential. Yet since vitamin D products have for the most part been derived from natural sources which cannot be controlled, it has been difficult to regulate the finished product.

Domestic Sources Practically Unlimited

Aside from the element of control in the manufacture of "Delsterol," however, is the fact that the domestic sources of supply of the sterols or chemical compounds that are used in its manufacture can be considered as practically unlimited. As a result, it is now possible for scientists to produce vitamin D in almost any quantity desired and at definitely regulated levels of potency.

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This scientific contribution to the poultry industry is only just beginning to make its imprint on poultrymen; but its need has been long felt.

Vitamins in themselves, of course, constitute an old, yet ever-new, subject to scientists and poultrymen alike. Indeed research chemists are so often turning up new facts and data about vitamins that constant review of previous findings is necessary.

About twelve years ago, Du Pont chemists started a search for a new and better source of vitamin D. This search was inspired mostly by the discovery that certain irradiated chemical compounds of plant origin, known as sterols, already recognized as an effective source of vitamin D for certain types of animals, were not effective for poultry. But there were other reasons for dissatisfaction with vitamin D supplements then in common use for poultry. Cod liver and other fish oils - the chief sources of vitamin D - were found to be entirely too variable. Also, these oils were imported, which meant they might be shut off entirely, or their supply substantially reduced, either by war or a poor catch of fish.

In some measure these conditions have been improved during the past few years, and fish oils have continued to be used as an important vitamin D supplement. But at the same time, chemical research has gone steadily forward on the trail of a new source of vitamin D that might offer a final solution to the poultry industry. In 1934, Du Pont scientists demonstrated that irradiated crude cholesterol (a chemical compound derived from animal sources) contained a vitamin D that was as effective as the vitamin D from cod liver oil for bone calcification in the chick.

Subsequent studies were made, and in 1937 the basis for the manufacture of "Delsterol" was established with the discovery of suitable raw materials or sterols of animal origin. These sterols were judged to be most suitable for irradiation with ultra-violet light, and they were also available in quantities that permitted economic production. Finally, more research uncovered abundant domestic sources of these sterols, rendering the United States permanently independent of all vitamin D imports.

The drama of this story is to be found in its climax; for the recent discovery of abundant sources of sterols suitable for irradiation coincided with the dwindling of stocks supplied from abroad. But the important research that was essential to this discovery had occupied years of patient effort.

Today the production of "Delsterol" is beyond the laboratory or semi-works stage, and the Du Pont Company has already announced that it can supply all present and future vitamin D requirements of the poultry industry. In New Jersey, a special plant has been equipped to extract the necessary sterols from their raw material source, to irradiate and process these sterols, and to mix this highly concentrated vitamin D with edible grain carriers. Chemically regulated production has been established for the entire operation, and "Delsterol" is being manufactured with a precision that was never possible for other sources of vitamin D.

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Potency Tested Before "Delsterol" Is Shipped

As is customary with all sources of vitamin D, the potency of "Delsterol" is tested on chicks before it is shipped. Using methods prescribed by the Association of Official Agricultural Chemists, called the "Vitamin D Assay by Preventive Biological Test," Du Pont laboratories conduct this assay or test with three times the required number of chicks, in order to reduce the factors of error to a minimum. Independent accredited laboratories also make identical tests as a further check on the Du Pont assays.

In the Du Pont laboratories, the chicks are divided into a number of groups and placed in brooders. A diet is prepared consisting of all the nutritional factors except vitamin D. It is made up of 58 per cent ground yellow corn, 25 per cent wheat flour middlings or wheat gray shorts, 12 per cent crude domestic acid-precipitated casein, two per cent calcium phosphate (precipitated), one per cent iodized salt (0.02 per cent potassium iodide), and two per cent non-irradiated yeast (7 per cent minimum nitrogen). The diet is fed to the entire group of chicks being used in the test. About one-half the chicks also receive graduated amounts of the "Delsterol" under test; of the other half, one group receives no vitamin D of any kind, and the others are given known amounts of reference cod liver oil. This is done to obtain a reference response for comparison with the response secured by feeding the "Delsterol" being tested.

For three weeks the various groups of chicks are fed their respective diets with careful laboratory attention to conditions of warmth, space, and sanitation. At the end of the test period, the chicks are examined for differences of growth and any external evidence of rickets. The birds receiving no vitamin D whatever are stunted, walk on their hocks, exhibit poor feathering, and are in a weak and unthrifty condition. The birds receiving progressively greater amounts of vitamin D show fewer and fewer symptoms of disease.

Finally the birds are weighed and killed. One of the long bones (the tibia) from each chick is then dissected out, and the percentage of mineral deposit in the tibias from the separate groups is determined. This is done by simply burning off the organic matter after removing the fat and water and by weighing the material which remains as ash. The ratio of the weight of ash to the weight of extracted and dried bones is in direct proportion to the quantity of vitamin D in the diet.

From this assay the potency of "Delsterol" is scientifically determined to corroborate the standards established in the manufacturing process. The potency, of course, is expressed in the initials of the Association of Official Agricultural Chemists: so many A.O.A.C. units of vitamin D per gram.

As "Delsterol" comes to the attention of increasing numbers of poultrymen throughout the country, it may reasonably be expected that questions will arise as to its use and how it fortifies feed with vitamin D. It is usual to mix one or more pounds of "Delsterol" per ton depending on the potency desired in the mixed feed. At present "Delsterol" is available at two levels of vitamin D activity: 1,000 and 2,000 A.O.A.C. units of vitamin D per gram.

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No special equipment is required for the addition of "Delsterol" to poultry feeds since it is shipped in edible powder form; and in the batch process it may be added along with the bran or middlings. When the continuous-mix method is used, proportioning feeders work with good results. The table below indicates the amount of "Delsterol" needed to fortify mash at various levels:

Pounds of "Delsterol" Per Ton		Vitamin D Potency of Mash	
1,000 A.O.A.C. chick units per gram	2,000 A.O.A.C. chick units per gram	Units Per 100 Grams	Units Per Pound
lbs.	lbs.		
1.0	0.50	50	227
1.5	0.75	75	340
2.0	1.00	100	454
2.5	1.25	125	567
3.0	1.50	150	680

Reviewing the entire vitamin D problem of the poultry industry, certain basic facts stand out. For nearly twenty years the use of fish oils has been an established practice for supplying vitamin D to poultry. Also through these years there has been an increasing effort to control the potency of vitamin D, and coincidentally extensive research has been carried on to find new and better sources of vitamin D.

The development of a product such as "Delsterol" has depended on a series of fundamental discoveries. First, came the discovery that exposure to sunlight or to an artificial source of ultra-violet light, produced vitamin D in the body of young and mature poultry. Then it was found that this effect could be obtained by exposing to ultra-violet light the feed which the poultry consumes. Later, certain specific chemical compounds or sterols were transformed into vitamin D when irradiated with ultra-violet light. Finally, a conspicuous difference was established between irradiated sterols from plant and animal sources.

From these broad discoveries a new scientifically controlled source of vitamin D has been developed which will render the poultry industry, with an annual income of something over a billion dollars, completely independent of vitamin D imports.

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"LIGHT-PIPING" DEVICES MADE OF "LUCITE"

EDITOR'S NOTE: Light and cleanliness are two requisites in the research laboratory. Any products which can be adapted and utilized to attain better lighting and more effective cleanliness of laboratory and equipment are of interest to research workers. The following two items discuss Du Pont products -- "Lucite" methyl methacrylate resin and cellulose sponges -- which have special applications for the laboratory. Other important uses of both products are also mentioned briefly.

A New Light in the Laboratory

The singular optical properties of "Lucite" methyl methacrylate resin, crystal clear plastic, are being utilized in "light piping" devices that are finding their way into the laboratories of agricultural and other research workers.

The ability of "Lucite" to "pipe" light in any direction can be used in many research operations to help solve otherwise difficult illumination problems. Light introduced at one end of a bent "Lucite" rod will not emerge until it reaches the opposite end, where it glows with practically its original intensity. This makes it possible to apply light at any desired point in complicated installations of laboratory equipment.

Useful in Surgery, Dentistry and Industry in General

Similar problems have also been solved for surgery by shatter-resistant "Lucite" instruments which transmit "heatless" light into body cavities.

A dental instrument made of "Lucite" serves as a cheek retractor and at the same time illuminates the oral cavity.

Curved "Lucite" rods are utilized for industrial tools designed to permit direct illumination in complex machinery and other spots inaccessible to conventional lighting devices.

Helps Translate Results of Research

"Light piping" also can be used to help translate the results of research to lay audiences by means of illuminated maps and charts.

A striking example of this was achieved at the Newark, N. J., Public Library where the state's library system is diagrammed in brilliant constellations of vari-colored lights on a giant map ingeniously fitted with "Lucite" rods.

Three systems of light arteries on the reverse side of the eight-foot-high plywood map transmit the light -- in four colors -- from 12 ordinary bulbs to 365

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points, representing cities and towns scattered through all the 21 counties in the state. The arteries are bent rods of "Lucite". They eliminate elaborate "wiring up" to the 365 outlets and reduce the number of chances for failure in the system from 365 to twelve.

The rods are arranged in clusters on the back of the map. Each cluster passes beneath a metal housing in which are four electric light bulbs -- green, white, amber, and red.

Green is for municipal libraries, white for county libraries, amber for those in townships, and red for libraries built before 1810. Switches at the side of the map control each set.

The quarter-inch lighted spots on the map are the ends of the rods set level with the map surface. The rods pick up the light in the housing and carry it to their ends.

The plan for the map originated with Miss Beatrice Winser, Newark librarian, in connection with a meeting of the New Jersey Library Association in Atlantic City, where the map was first shown. Walter Nolte of the library staff cut the map out of plywood and John Kiernan of the Edward J. White Company, Newark, solved the requirements with the application of "Lucite" rods.

Since "Lucite" rods are easily bent under the influence of heat, they can be fabricated into almost any shape.

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CELLULOSE SPONGES ABSORB 20 TIMES THEIR WEIGHT IN WATER

EDITOR'S NOTE: Since they were first placed on the market, a large number of diversified uses have been found for cellulose sponges. In addition to a variety of uses on the farm, in the home, and in industry, mentioned briefly below, cellulose sponges, particularly the fine-pore type, have been employed to advantage to clean laboratory apparatus and equipment, as discussed below.

Fine-Pore Type Especially Useful in Laboratory

Fine-pore cellulose sponges, softer and finer in texture than the standard type, are being used for numerous specialized purposes, particularly for delicate cleaning operations in the laboratory.

Cellulose sponges are useful for washing beakers and similar apparatus, in absorbing spilled liquids, and for general clean-up purposes. They have even been used as a medium for the growing of bacterial spores. Since they float, they do not pick up grit from the bottom of a pail or other vessel; in addition, they are free from lint and other extraneous matter, which makes them especially adapted for drying and polishing. They are not affected by cleaning compounds in normal concentrations. Generally speaking, any concentration which does not attack the hands will not affect the sponge. They are easily sterilized in boiling water, a characteristic of great value to the laboratory technician. The interconnected pores and the sponge material itself have a peculiar capillary attraction for water. This makes for extraordinary qualities of absorption up to 20 times the weight of the sponge.

Used on the Farm and in the Home

Since they were first placed on the market, a large number of diversified uses for cellulose sponges have been found.

On the farm, cellulose sponges of the standard type are used in the dairy industry for washing of the udders of cows and for cleaning utensils. Dairymen also use cellulose sponges for general cleaning purposes and for washing and polishing stainless-steel equipment such as pasteurizers, coolers, storage tanks, and sanitary piping. Livestock men use them to wash and groom farm animals of all kinds.

In the home, important uses include washing windows, dishes, and glass surfaces where cellulose sponges can safely be used because they are free from sand and grit. Housewives also use them to clean pots and pans, iceboxes, and refrigerators, sinks, drainboards, kitchen cabinets, and shelves. Small pieces function well in cleaning and polishing silver. They have found favor as a bathtub accessory, especially among children. Spilled liquids can be removed quickly

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from upholstery and rugs, and when the sponges are free of excess water they make short work of dog hair and lint on carpets and furniture.

Car owners use cellulose sponges to wash automobiles, squeezing the sponges dry after the initial sponging to use in place of a chamois.

Typical Industrial Applications

Industrially, cellulose sponges of the standard type have found favor in cleaning, particularly smooth wall surfaces. The fine-pore types have been used successfully in the photographic field for the washing of negatives and for sponging the ferro-type tins on which prints are dried. New applications are found constantly. Recently the cellulose sponge was adapted as a brow pad for surgeons, keeping perspiration from obscuring their vision. So well did this use of the sponge work out in the operating room that it spread to the golf course and tennis court.

Made of Viscose from Purified Cotton and Wood Pulps

The cellulose sponge is described as a sponge-like piece of cellulose which has been regenerated from viscose. The method of manufacture begins with a mass composed of viscose (from highly purified cotton and wood pulps) and a pore-forming material such as the crystals of a salt. The mass is pressed into a mold and the cellulose regenerated from the viscose by means of heat. It is then set up as a solid, forming the skeleton of the sponge. Simultaneously, the pore-forming crystals melt, leaving the familiar pore-like texture. The sponges are then washed, purified, and dried in the conventional manner.

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EXPERIMENTS WITH PACKAGING CORN ON COB AND DRESSED TURKEYS

EDITOR'S NOTE: Previous issues of the "Agricultural News Letter" have presented information, based on experimental evidence, regarding the effective packaging of certain farm products with cellophane cellulose film. Vol. 9, No. 4, July-August, 1941, gave a brief review of research work with "visible" packaging. It pointed out that the Du Pont Cellophane Division was cooperating in packaging research (1) with the grower packing in the field; (2) with the large city repacker or wholesaler; (3) with the chain-store central packaging in their own warehouse for local distribution; and (4) with the small retailer packaging in his own store to make the most efficient use of his clerks' time during slack hours. Results of two experiments -- one with corn on the cob at Michigan State College and one with dressed turkeys at California Polytechnic Institute -- are reported briefly below.

Buyers Prefer Corn on the Cob Wrappped in Cellophane

Assuming that more sweet corn could be sold if buyers could be sure of good quality, Keith C. Barrons, Michigan State College vegetable specialist, tried the following experiment:

Ears fresh from the field were husked, silked, and tips cut off. They were then bunched in half dozens in pyramid form, wrapped in cellophane at an extra cost of about four cents.

The price to consumers was higher than for ears with husks on, but buyers were willing to pay the extra cost because they could see that the ears were of uniform size and good quality, free from worms.

"Farm Journal", Vol. 60, No. 8, reporting this experiment, said that one retailer was willing to handle the cellophane packages on a 20% margin, as against 30% for ears with husks on, because there was less waste. The six-ear pyramids brought 15 cents at the time good-quality corn with husks on was bringing 15 cents a dozen at grocers and ten cents a dozen on farmers' markets.

"Visible" Packaging of Dressed Turkeys

Richard I. Leach of California Polytechnic Institute, observing that proper packaging of food products prior to retail sale greatly enhances the appeal of that product to the consumer, tried an experiment in connection with the sale of dressed turkeys during the holiday season. He wrapped them in cellophane.

This experiment was very successful and profitable. More than 500 turkeys, most of which were wrapped in cellophane, were sold. In fact, there were more

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orders than could be filled, as the number of birds available for sale depended on the limited time the project students at the Institute could work in the laboratory and after school hours.

The birds were trussed and prepared ready for the oven, with the neck and giblets wrapped in wax paper and placed inside the bird before it was wrapped. The legs were folded through a band in the abdomen made by drawing the bird in two places. All the housewife had to do was remove the wrapped neck and giblets thus leaving room for stuffing in the front of the breast of the bird. Experience proved that the customers were willing to pay a nominal extra price for trussing and special wrapping.

Mr. Leach found that the average housewife wanted hens weighing 12 to 16 pounds and toms weighing 18 to 22 pounds. By running specials on large toms at one or two cents a pound below current prices, large toms were sold to individual families.

"Pacific Rural Press", Vol. 142, No. 1, in commenting on the experiment, concluded that the cellophane wrapping of birds for retail sales (1) appeals to housewives who can see the quality and finish of the bird without unwrapping; (2) facilitates handling because the birds can be wrapped and labeled ahead of delivery; and (3) makes a sanitary package as it is sealed airtight with cellulose tape.

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20 YEARS OF RESEARCH ON SEEDLING BLIGHT AND BOLL ROT OF COTTON

EDITOR'S NOTE: The following release from the University of Arkansas Agricultural Experiment Station reviews results of 20 years of research there to find a method of control of seedling blight and boll rot, two cotton diseases prevalent throughout the South. It tells of difficulties encountered with methods developed during early studies, but states that by 1937 results of additional research revealed two organic mercury dusts as the most desirable for cotton seed treatment.

Two common and highly destructive diseases of cotton in Arkansas are seedling blight and boll rot. Their control means less replanting, better stands, and higher yields.

According to Dr. V. H. Young of the University of Arkansas College of Agriculture, most of the seedling blight in Arkansas is caused by the cotton anthracnose fungus, which is largely, if not entirely, seed-borne; a certain amount, however, is caused by soil-borne organisms. The development of the seedling blight of cotton, caused principally by the anthracnose fungus, is favored by early planting and cool, wet weather during the planting season, the plant pathologist said. When boll formation is accompanied by wet weather, the fungus attacks the bolls, causing boll rot.

Angular leaf spot, which causes serious losses due to boll rotting, also plays a dual role. Its appearance is first revealed by small, waters-soaked spots on the leaves of the seedlings. The disease spreads as the plant develops, thereby reducing the plant's efficiency. However, Dr. Young said, it is most destructive when it attacks the bolls. Like the cotton anthracnose fungus, the angular leaf spot germ is a seed-borne organism.

Search for a method to control these diseases has been carried on for more than 20 years by the College of Agriculture, Dr. Young reports. The early studies dealt with delinting cotton seed with sulphuric acid. The treatment largely controlled seed-borne diseases of cotton, but in years of heavy rainfall, the seed frequently rotted in the ground. This difficulty, coupled with that encountered in handling the sulphuric acid delinting method under home conditions, led to a search for other methods.

Attention was then turned, he said, to treating cotton seed by dipping the seed in solutions of organic mercury disinfectants, particularly hydroxymercurichlorophenol, sold under the trade-mark of "Semesan". This treatment controlled both seedling blight and boll rot very effectively, and returned yield increases of 25 per cent in seed cotton. However, planting the wet cotton seed or drying the seed after dipping it in the disinfecting solution presented difficulties.

Then came the development of organic mercury dusts and inorganic copper and zinc dusts for treating seed, especially cereals. This development led to the study

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of many of these dusts as treatments for cotton seed. Under Arkansas conditions, Dr. Young said, the organic mercury dusts gave the better control of seedling blight and without injuring the seed. Consequently, the inorganic copper and zinc dusts were eliminated from the experiments.

By 1937 the research work revealed two organic mercury dusts as the most desirable for cotton seed treatment. These were 2 per cent ethyl mercury chloride dust and 5 per cent ethyl mercury phosphate dust, sold under the trade-marks of 2 per cent "Ceresan" and New Improved "Ceresan." The dusts were effective in destroying the disease germs on the seed, and, because the dust clings to the seed, it provided considerable protection against soil-borne fungus parasites. Experiments at the College's Main Experiment Station and its Cotton Branch Experiment Station show that "Ceresan"-treated seed may be expected to produce, on the average, yield increases of 8 to 15 per cent in seed cotton. Seed treatments, he pointed out, frequently double the stand of cotton, greatly reduce the number of weak and diseased plants, often make replanting unnecessary, and greatly reduce boll rot caused by angular leaf spot and the cotton anthracnose fungus.

Dr. Young said the most effective time to treat cotton seed with either of the two dusts is about a month before planting. Under farm conditions there is less danger of injurious effects from 2 per cent "Ceresan" to the persons treating the seed than from New Improved "Ceresan".

More recently newer dusts recommended by their manufacturers for cotton seed treatment have been studied. These include Sanoseed, Spergon, Spergonex. Experiments with the new dusts have not been conducted long enough to give a true evaluation of their effectiveness under Arkansas conditions.

Although 2 per cent "Ceresan" and New Improved "Ceresan" have been effective in controlling seedling blight and boll rot, Dr. Young said the search continues for even more effective methods of control. A study is now being made by the College of Agriculture of the effectiveness of organic mercury dust on delinted seed. Both machine and sulphuric acid delinted seed are being used. Under certain conditions the combination of the delinted seed and organic mercury dust appears to give better results than when the dust is applied to ordinary fuzzy seed. Seedlings emerge more rapidly from delinted seed than from fuzzy seed, and planters, such as are used for corn, may be employed. However, he said the experiments have not been conducted long enough to definitely determine that delinting plus chemical dust treatment will be satisfactory under all types of weather and soil conditions.

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TEXTILE RESEARCH TODAY

EDITOR'S NOTE: The following is a summary of a paper presented before the Home Economics Section at the annual convention of the Association of Southern Agricultural Workers in Memphis, Tenn., Feb. 5, 1942. It outlines briefly some of the new approaches to the textile research problems brought about to a large extent by the war. Miss O'Brien stresses the fact that textile research today is being conducted to meet military needs first, with normal uses secondary. However, she points out that "all such research, whether on fabric construction and finish or on clothing design, will have its effect -- no doubt a beneficial effect -- on the civilian clothing of the future." Her remarks are printed here by permission.

By Ruth O'Brien, Chief,
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In the victory program, food comes first, we admit, but clothing is a close second. Cloth is something we cannot live without. It covers our bodies, our furniture, our floors. It drapes our windows. It furnishes our beds.

And cloth now means even more than civilian clothing and house furnishings to the nation. It means tents, tarpaulins, and gun covers. It means fabrics for uniforms, airplane wings, barrage balloons, parachutes - and a myriad of other military uses. Today cloth is a valuable weapon. Warm, serviceable clothing can turn the battle-tide.....the day-by-day story from Russia proves the truth of this.

Because of the war, textile research is quite different from five years ago. Research usually reflects at least to some extent the economic situation of the day.

The United States Army is rapidly being increased. We are proud to say that these men are clothed better than any army in history has ever been clothed.

This means that money, material, and labor are being expended without stint. During the past fiscal year, the Philadelphia Quartermaster Depot - the center of procurement for the Army - spent over 565 million dollars for textiles, garments, and similar supplies. The Navy and the Marine Corps are making proportionate purchases.

All of this vitally affects textile research programs, whether in industry, in government, or in non-governmental laboratories. For example, one policy which has come to the fore in this more than in any other war is that fabrics for military use must meet specific specialized needs. Some of us have for years

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been trying to introduce this idea into the production of consumers' goods. Fabrics for consumers should, of course, also be designed for the particular job the user wants them to do. They should do more than merely look attractive enough to move from the retailer's shelves into the hands of customers who later are dissatisfied and feel cheated when their purchases fail in service.

But home economists have never been especially successful in getting a widespread acceptance of this idea - of making fabrics that will meet specific needs. At the Bureau of Home Economics we tried to help, as far as our limited facilities permitted, by demonstrating the idea through such studies as those on cotton fabrics suitable for children's play suits and by the development, in cooperation with the Bureau of Agricultural Economics, of a cotton fabric to replace the jute ones commonly used as a backing for hooked rugs.

Today the military services are demonstrating the idea on a grand scale. One example is the new snag-proof fabric the Army has developed for its parachute troop uniforms - tough, smooth, and slick so it will not catch and tear easily. Another is the cotton twill which has been found so much better than denim for fatigue uniforms.

Perhaps all this will rebound to the good of consumers after the war. There is at least talk now of the development of specific fabrics for work clothes for women - fabrics better suited to the many different kinds of jobs women are being called upon to do on farms, in factories, in the defense industries. This may mean a new concept of fabric construction research - the production of fabrics more appropriate for consumers' needs, whether in peace or in war.

Fabric finishes are not only coming to the front - they are going to the front. Waterproofing for coats and equipment is being used - also fireproofing for tents to prevent disastrous fires in tent camps such as we have had before, and mildewproofing for naval equipment and for sandbags. Preshrinkage treatments are helping to prevent those misfit cotton uniforms we saw in 1917. Research is not only attempting to find finishes and treatments which will improve the usefulness of fabrics for specific jobs - efforts are also being made to find ways of getting these onto the cloth with fewer processes and with greater efficiency, thus conserving time and labor.

Clothing designs are coming in for their share of study. Never before have there been so many different specialized garments in the military service. Different clothing designs have been developed and are in use for tank suits, for parachutists, and army motorcyclists. Work and field uniforms have all been revamped to better fit the job. A new service jacket, developed for warmth and comfort as well as for the morale-lifting effect, is receiving much favorable comment.

All such research, whether on fabric construction and finish or on clothing design, will have its effect - no doubt a beneficial effect - on the civilian clothing of the future.

But how is the war affecting civilian goods now? The answer is "For the worse." Our mills are running at capacity. They are of course giving first place to

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military goods. This is as it should be. Civilian needs must be subordinated to the all-important job of winning this war.

Scarcity of fibers has brought out a number of substitutes. Our wool and linen supplies are reduced by shipping difficulties in the Pacific and in the Atlantic. Silk imports have practically stopped. Our rubber shortage prohibits the use of new developments in elastic fibers. Fiber stock piles in whole or in part must be diverted to military uses. Certain chemicals and solvents that go into making synthetic fibers are needed for making munitions.

However, this situation does bring about an unprecedented opportunity for research on the effect of fiber substitutions on fabric performance. It stimulates us to find new ways of using our American-grown fibers and to experiment with the production and service-in-use of those formerly imported. Home Economists trained in textile and clothing research might well focus their efforts in these fields. Homemakers are daily raising questions concerning the relative durability and warmth of clothing and household textiles containing varying amounts of wool substitutes. I wonder if there could not be a cooperative effort by home economists to collect data of this kind as these fabrics come on the market?

Collecting such data would be possible, of course, only in the case of fabrics and garments labeled accurately as to fiber content. Incidentally, it is indeed very fortunate that, in this time of wool substitutes, consumers have the protection of the Wool Labeling Act.

In some quarters efforts are being made to suspend it for the duration, or to repeal it. Granted that this Act does not give the public as much information about fabric quality as is needed for completely informative buying, it is far better than no protection at all.

The need for informative labels is greater than ever before. While consumers should and are accepting shortages and inconveniences cheerfully, certainly in times such as these, when intelligent buying is more important than ever, they should be given all the information possible about the qualities of goods from which they must attempt to make wise selections.

Moreover, now that we must live with shortages, the smaller amounts of material and labor available for consumers' goods should be used for articles in the low and medium priced groups. In this way, larger supplies of each item could be produced and a greater part of the public be served. A tendency seems to be developing where federal orders permit, for manufacturers and retailers to interest themselves in dollar volume rather than in consumer service - in other words, using available materials in making higher-priced goods - those with wider margins of profit, rather than in producing lower priced goods. Economic research is badly needed to guide production of civilian textiles, as well as other commodities, so that the greatest number of people will be served.

To return to our discussion of purely textile research: Never has the entire country been as interested in making use of American cotton. This has certainly

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been demonstrated in a striking manner by the experience of the Bureau of Home Economics in its research on cotton hosiery.

When this job was suddenly handed to us three years ago by a Congress interested in finding uses for surplus cotton, we faced a very up-hill job. Our first chore - and a hard one - was finding personnel experienced in designing cotton hose. The next was in finding mills willing to let us use a knitting machine and operator to make up the designs originated at the Bureau. In fact, although we were prepared to pay very adequately for this service, 22 mills were personally approached before one very unenthusiastically entered into a contract with us.

During the months that followed, this attitude gradually warmed up as Mr. David Young, our designer, showed what could be done. And the morning the ban on Japanese silk went into effect, its temperature reached fever heat - to put it mildly. Requests came pouring in upon us for the 300 designs Mr. Young had developed by that time.

Today the demand for the high count cotton yarns suitable for the sheerest types of hosiery far exceeds the supply. It happens that these yarns are also used by the military services for certain types of clothing and equipment. The job now is to find hosiery constructions and chemical finishes that will make the lower count yarns of shorter staple length cotton satisfactory for women's hose. There is also the problem of developing types of durable work hose suitable for the many jobs women are undertaking in the war.

Other fields of research now coming into prominence deal with the development of production and utilization programs for flax, hemp, and other fibers which might well be produced and manufactured in this country, at least to a limited extent. This would not only provide needed commodities during war time but, it would also increase opportunities for employment and supply useful goods during post-war adjustments.

Clothing construction is another field which should not be overlooked. The complete standardization of pattern and garment sizes would eliminate much waste in the clothing industry. Home economists concerned with clothing have recently proven that through cooperative effort the body measurements which are needed for pattern and garment size standards can be produced. Due to their willingness to pool their resources, 147,000 children and about 15,000 women were measured, in widely scattered communities throughout the country. The final reports on these studies recently came from the press. Already pattern sizes are being adjusted in accordance with the findings of the first of these projects, and a standard for sizing boys' clothing has been accepted by the trade.

The next of this series of studies which should be attacked is the sizing of shoes and gloves. As was true in the case of other garments before the studies recently published, no improvements can be attempted profitably until a scientific study is made of the dimensions of the hands and feet of a representative sample of our population.

Questions are often raised as to what part clothing designs can take in research

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programs. The field of functional clothing is one answer. Certainly the war has emphasized the need of this kind of study, both for the military services and for civilians.

In the case of women, certainly work clothing is one of the most important problems at the moment. The garments shown at the meeting of the Association of Southern Agricultural Workers illustrate the efforts the Bureau of Home Economics has been making along this line. Much remains to be done, and it is not easy.

Development of successful garments requires all the science, art, and ingenuity the worker can muster - a fact which in itself warrants the classification of this work as research. Science, art, and ingenuity! Add a dash of energy, courage, and persistence, and what do we have? We have all the ingredients needed for any successful research program - all the ingredients needed to win a war.

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Agricultural News Letter (Du Pont)
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FORESTRY GROUP URGES EMPLOYMENT OF EMERGENCY FORCES TO MEET IMPENDING DANGER OF FOREST FIRES FROM SABOTAGE AND AERIAL INVASION

EDITOR'S NOTE: Accelerated research in the use and production of cellulose, plywood, lumber, and other forest products related to war needs was included as one of three "lines of action" which the board of Directors of the American Forestry Association urged on forest agencies of the country as of first importance in promoting the common cause of victory. The resolution listed as the outstanding problem claiming undisputed priority, the emergency developed by impending danger of sabotage and aerial invasion as related to forest fires, and maintenance of continuous production of wood and other forest products essential to the prosecution of the war.

By L. F. Livingston, Manager,
Du Pont Agricultural Extension Division,
and Member, Board of Directors, American
Forestry Association.

Because of the gravest forest fire emergency in the nation's history, made immediately critical by the impending danger of sabotage and aerial invasion, forest fire protection was set forth as first of three lines of action claiming undisputed priority among forestry agencies, in a resolution adopted by the Board of Directors of the American Forestry Association on March 19.

In transmitting the resolution to President Roosevelt, the Association emphasized not only the urgency for adequate funds, manpower, and equipment to meet the critical fire emergency, but also stressed that in the interest of unified effort, highly controversial issues, such as federal regulation of privately owned timberland, be set aside until the war is won.

Extracts from the letter of transmittal, signed by W. S. Rosecrans, president of the Association, include: "We are deeply concerned over this danger in that adequate preparedness to prevent and deal with great outbreaks of forest fires is not now assured ..... The possibilities of employing this weapon for internal thrusts against us are naturally well known to our enemies, perhaps better than to our own citizens ..... A great forest holocaust timed for an invasion by our enemies could provide them with a covering smoke screen on both land and coastal waters ..... This, we submit, is so clearly priority number one in the forest field as not to need elaboration....."

The Association urged upon President Roosevelt that the U. S. Forest Service, "which is looked to as the responsible leader in the forest protection field," direct its leadership in this spirit of common unity. Mr. Rosecrans states that the forest protective agencies estimate that some $15,000,000 are needed

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to employ emergency forces and purchase equipment to meet the exigency confronting them, and urges "immediate appropriation or allocation of the funds needed."

He says that further delay means last minute preparations at best, and "they may come too late to avoid a catastrophe that may prove a crippling blow in one or more sectors of our war program."

The three-point resolution adopted by the Board follows:

Resolution Passed by Board of Directors of The American Forestry Association

"Our country being now engaged in a life and death struggle in which the protection and use of our natural resources are essential to the winning of the war and the achievement of peace, the Directors of The American Forestry Association call upon all conservation agencies and forest users -- federal, state, and private -- to dedicate their undivided efforts to the doing of those things that are clearly of first importance within their field in promoting the common cause of victory.

"In the forest field they hold that three lines of action now claim and should have undisputed priority. They are:

(1) Protection of forest and related resources and of war industries, including power, water and transportation lines essential to their operation, against the impending danger of forest fires.

This is an immediately critical threat to our war efforts:

First, because in addition to normal forest fire hazards, sabotage by our enemies of our production of wood, our supply lines and operation of war industries through widespread setting of forest fires by aerial bombing and ground incendiarism is not only possible but probable this summer;

And, second, because adequate preparedness against such a contingency is not now assured.

The danger is particularly acute on the Pacific Coast where vital war industries are concentrated and from which our prosecution of the war in the Pacific is based.

(2) Maintenance of continuous production of wood and other forest products essential to the prosecution of the war. Most of the war industries, the training of our armed forces and the shipment of supplies and equipment to the fighting fronts of the United Nations is dependent in large part upon an uninterrupted production and delivery of wood in raw and fabricated forms.

(3) Accelerated research in the use and production of cellulose, plywood, lumber and other forest products related to war needs.

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Such research will not only promote the conservation of our forest resources but it will strengthen and speed our war effort by providing improved equipment and by helping to overcome shortages in other materials that are now or may in the future impede war action.

"We believe that the accomplishment of these objectives is vital to the winning of the war and that they should have the united and supreme effort of all individuals and groups in the forest field.

"To this end we urge that highly controversial issues, such as federal regulation of privately owned timberlands, be set aside until the war is won, without prejudice as to their merit or desirability when normal conditions of American life are reestablished."

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